

Application Serial No.: 10/663,759  
Reply to Office Action dated February 1, 2006

### REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 4-15, 18-24, and 28-48 are presently active in this case, Claims 4-11, 14, 15, 18, 20, 23, 28-35, 38-40, 42, and 44 having been amended and Claim 1-3, 16, 17, and 25-27 having been canceled without prejudice or disclaimer by way of the present Amendment.

Claims 18-22, 23/18-22, 24/23/18-22, 42-46, 47/42-46, and 48/47/42-46 are allowable if rewritten in independent form. The Applicant notes that these claims were indicated as being allowable in their previously pending form, and therefore these claims have been rewritten in independent form not including the amendments set forth in the prior Amendment. The Applicant submits that these claims are in condition for allowance.

In the outstanding Official Action, Claims 1-3, 6, 7, 11-14, 16, 23-27, 30, 31, 35-38, 40, 47, and 48 were rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki (U.S. Patent No. 5,870,133) in view of Iwanaga et al. (JP 8-7294). For the reasons discussed below, the Applicant traverses this obviousness rejection.

The basic requirements for establishing a *prima facie* case of obviousness as set forth in MPEP 2143 include (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) there must be a reasonable expectation of success, and (3) the reference (or references when combined) must teach or

suggest all of the claim limitations. The Applicant submits that a *prima facie* case of obviousness has not been established in the present case because the references, either when taken singularly or in combination, do not teach or suggest all of the claim limitations.

Claims 6 and 30 recites a light source unit that comprises, among other features, a supporting unit or means is formed, as one set, consisting of the first and second holding faces or means aligned approximately in parallel to the optical axis of the first coupling lens or means for holding the first coupling lens, and at least two sets of the supporting unit or means are formed integrally as one component. The Applicant submits that Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

The Naiki reference depicts in Figure 2 a configuration that uses two laser beams emitted from two semiconductor laser elements (1, 1'), each with a collimator lens (2, 2'). The units constructed to support the collimator lens (2, 2') are separate units that are bolted onto a common plate. Such a configuration requires alignment of the units upon the plate. Thus, it is evident from a review of the Naiki reference that this reference does not disclose *two sets of holding faces formed integrally as one component*, as recited in Claims 6 and 30 of the present application. The units of the Naiki reference are formed as two separate components.

The Iwanaga reference fails to supplement the above deficiency in the teaching of the Naiki reference. The Iwanaga reference describes a single L-shaped lens holder, and therefore fails to disclose two sets of holding faces formed integrally as one component.

Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 6 and 30.

Claim 7 recites a light source unit that comprises, among other features, a supporting unit is formed, as one set, consisting of the first and second holding faces aligned approximately in parallel to the optical axis of the first coupling lens for holding the first coupling lens, and at least two sets of the supporting unit are arranged such that a direction of the at least two sets, in terms of a direction of the optical axis, a primary scanning direction and a secondary scanning direction, is identical to each other. Claim 31 recites similar features using means-plus-function terminology. The Applicant submits that the Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

By way of illustration and not limitation, Figure 9 of the present application depicts an embodiment in which two sets of the supporting unit are arranged such that a direction of the at least two sets, in terms of a direction of the optical axis, a primary scanning direction and a secondary scanning direction, is identical to each other. Note the directions that are identical to one another.

The Naiki reference depicts in Figure 2 a configuration that uses two laser beams emitted from two semiconductor laser elements (1, 1'), each with a collimator lens (2, 2'). The units constructed to support the collimator lens (2, 2') are oriented in directions that are *perpendicular to one another*. Thus, it is evident from a review of the Naiki reference that this reference does not disclose at least two sets of supporting unit that are arranged such that a *direction* of the at least two sets, in terms of a *direction of the optical axis, a primary scanning direction and a secondary scanning direction*, is *identical* to each other, in the manner recited in Claims 7 and 31 of the present application.

The Iwanaga reference fails to supplement the above deficiency in the teaching of the Naiki reference. The Iwanaga reference describes a single L-shaped lens holder, and therefore fails to disclose two sets oriented in the recited manner.

Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 7 and 31.

Claim 8 recites a light source unit that comprises, among other features, a supporting unit is formed, as one set, consisting of the first and second holding faces aligned approximately in parallel to the optical axis of the first coupling lens for holding the first coupling lens, and at least two sets of the supporting unit are arranged such that a direction of the at least two sets, in terms of a direction of the optical axis, a primary scanning direction and a secondary scanning direction, is symmetrical to each other. Claim 32 recites similar features using means-plus-function terminology. The Applicant submits that the Naiki

reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

By way of illustration and not limitation, Figure 5 of the present application depicts an embodiment in which two sets of the supporting unit are arranged such that a direction of the at least two sets, in terms of a direction of the optical axis, a primary scanning direction and a secondary scanning direction, is symmetrical to each other. Note the directions that are symmetrical to each other.

The Naiki reference depicts in Figure 2 a configuration that uses two laser beams emitted from two semiconductor laser elements (1, 1'), each with a collimator lens (2, 2'). The units constructed to support the collimator lens (2, 2') are oriented in directions that are perpendicular to one another. Thus, it is evident from a review of the Naiki reference that this reference does not disclose at least two sets of supporting unit that are arranged such that a *direction* of the at least two sets, in terms of a *direction of the optical axis, a primary scanning direction and a secondary scanning direction*, is *symmetrical* to each other, in the manner recited in Claims 8 and 32 of the present application.

The Iwanaga reference fails to supplement the above deficiency in the teaching of the Naiki reference. The Iwanaga reference describes a single L-shaped lens holder, and therefore fails to disclose two sets oriented in the recited manner.

Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 8 and 32.

Claim 11 recites a light source unit that comprises, among other features, an elastically pressing member that is formed of planar elastic material, and wherein ends of the elastically pressing member are fixed so as to hold in between the portion of the first coupling lens in contact with the holding face. Claim 35 recites similar features using means-plus-function terminology. The Applicant submits that the Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

By way of illustration and not limitation, Figures 5 and 7 of the present application depict an embodiment in which springs (16a) and (16b) are provided to elastically press the coupling lens (2a) and (2b), respectively, against two supporting faces (6a, 7a) and (6b, 7b) on the supporting groove.

The Naiki reference depicts in Figures 5(a) and 5(c) a configuration that includes plate spring (21) held by screws that fixedly mounts the lens barrel (15) to platform (16). Additionally, the cylindrical lens (5) is held stationary via pressure exerted by plate springs (17) and (18) at the endface which is not inserted in the interior member (15b) of exterior member (15a) of the lens barrel (15). Thus, it is evident from a review of the Naiki reference that this reference does not disclose an elastically pressing member that is formed of planar elastic material, wherein ends of the elastically pressing member are fixed so as to hold in between a portion of a first coupling lens in contact with a holding face, in the manner recited in Claims 11 and 35 of the present application. The plate springs described in the Naiki

reference are not fixed so as to hold in between a portion of the collimator lenses (2) and (2') which are cited for the teaching of the coupling lenses.

The Iwanaga reference fails to supplement the above deficiency in the teaching of the Naiki reference. The Iwanaga reference describes an elastic member (3) that is fixed at only one end, rather than at ends thereof so as to hold in between a portion of a coupling lens, and therefore fails to supplement the deficiency in the teaching of the Naiki reference.

Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 11 and 35.

Claim 14 recites a light source unit that comprises, among other features, a light source holding unit holding a first light source of the plurality of light sources attached to the coupling lens holding unit, the first light source corresponding to the first coupling lens, wherein the coupling lens holding unit, a package unit of a semiconductor laser diode, and the light source holding unit are formed of materials which are selected to satisfy the following relationships:  $\alpha_1 \leq \alpha_3$ ,  $\alpha_1 \leq \alpha_2 \leq \alpha_3$  and  $\alpha_1 \leq \alpha_4 \leq \alpha_3$ , where  $\alpha_1(1/K)$ ,  $\alpha_2(1/K)$ ,  $\alpha_3(1/K)$  and  $\alpha_4(1/K)$  are coefficients of linear thermal expansion of the first coupling lens, the coupling lens holding unit, the package unit and the light source holding unit, respectively. Claim 38 recites similar features using means-plus-function terminology. The Applicant submits that the Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

The Official Action cites light source device (A) of the Naiki reference for the teaching of the package unit or means of a semiconductor diode recited in Claims 14 and 38.

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However, the Applicant submits that the Naiki reference does not disclose a particular material for use as the packing unit of the semiconductor laser element (1) of the Naiki reference. In fact, the light source device (A) is described as including several components including the collimator lens (2)(see column 8, lines 57-62.), which is indicated in the Official Action as being made of glass and not aluminum. Thus, the Naiki reference fail to disclose any particular coefficient of linear expansion for the packing unit of the semiconductor laser element (1), and therefore the Naiki reference clearly does not disclose all of the limitations recited in Claims 14 and 38, which require a coefficient that satisfies the defined inequalities.

The Iwanaga reference fails to supplement the above deficiency in the teaching of the Naiki reference, as the Iwanaga reference does not provide the coefficients of linear thermal expansion defined in Claims 14 and 38.

Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 14 and 38.

Claim 40 recites a light beam scanning unit comprising a light source unit for emanating light beams, comprising a plurality of light source means, a plurality of coupling lens means each corresponding to a light source means of the plurality of light source means, a coupling lens holding means having a first and a second holding face means aligned approximately in parallel to an optical axis of a first coupling lens means of the plurality of coupling lens means, and an elastically pressing means for pressing a side portion of the first coupling lens means against the first and the second holding face means so as to hold the first



coupling lens means; a light beam deflection means for receiving and subsequently deflecting light beams emanated from the light source means; and an optics system means for focusing the light beams onto a means to be scanned and scanning along a primary scanning direction. The Applicant submits that the Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

The Applicant submits that the Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination, the elastically pressing means recited in Claim 40. The Applicant submits that the means plus function elastically pressing means is interpreted in light of the embodiments in the specification and equivalents thereof. As noted above with respect to Claims 11 and 35, the Naiki reference and the Iwanaga reference fail to disclose or suggest an elastically pressing means as interpreted in light of the embodiments in the specification or any equivalents thereof. Accordingly the Applicant respectfully requests the withdrawal of the obviousness rejection of Claim 40.

Claims 4, 9, 28, and 33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki in view of Iwanaga et al. and further in view of Watanabe (JP 9-186395).

Claims 4, 9, 28, and 33 recites a light source unit comprising, among other features, at least one of a first coupling lens or means and a holding face or means is provided with a lubricating means at a location in contact there between. The Applicant submits that Naiki reference, the Iwanaga reference, and the Watanabe reference should not be combined in the manner suggested to arrive at the invention recited in Claims 4, 9, 28, and 33.

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The Official Action notes that the Naiki reference and the Iwanaga reference fail to disclose lubricating means set at a location in contact between the coupling lens and the holding face. The Official Action cites the Watanabe reference for such a teaching.

The English translation of the Watanabe reference describes a laser holder (22) and a lens holder (26) that are formed of the same material, where the outer diameter of the inner member is set slightly larger than the inner diameter of the outer member, and the inner member is precisely press-fitted into the outer member so as to be positioned and mechanically fixed. The Watanabe reference also describes the use of adhesive agent that functions as lubricant and an air vent groove (28) that provides for smooth press-fitting operation.

The Applicant submit that one of ordinary skill in the art would not have been motivated to combine the Watanabe reference with the Iwanaga reference based on the express teachings in each of these references, which teach away from one another. The Iwanaga reference expressly teaches a configuration in which adhesive is not used. The Iwanaga reference expressly teaches against the use of adhesive to prevent any fear that defocusing will occur due to swelling and shrinking of the adhesive. Thus, the combination of the teachings of the Watanabe reference and the Iwanaga reference would be directly contrary to each of those references. One of ordinary skill in the art would not have been motivated to make such a combination absent hindsight considerations.

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Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 4, 9, 28, and 33, and all claims that depend therefrom.

Claims 5, 8, 10, 17, 29, 32, 34, and 41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki in view of Iwanaga et al. and further in view of Nakajima et al. (U.S. Patent No. 6,621,512). Claims 15 and 39 were rejected under 35 U.S.C. 103(a) as being unpatentable over Naiki in view of Iwanaga et al. and further in view Tanaka (U.S. Patent No. 5,315,609).

Regarding the rejection of Claims 5, 10, 29, and 34 and all the claims that depend therefrom, the Applicant notes that Claims 5, 10, 29, and 34 recite a light source unit comprising, among other features, a portion of a first coupling lens or means in contact with a holding face or means is subjected to surface hardening. The Applicant submits that the Naiki reference, the Iwanaga reference, and the Nakajima et al. reference fail to disclose or suggest such features, either when taken singularly or in combination.

The Official Action notes that the Naiki reference and the Iwanaga reference fail to disclose a portion of a coupling lens in contact with the holding face is subjected to surface hardening. The Official Action cites the Nakajima et al. reference for such a teaching. The Official Action specifically recites column 9, lines 14-24, of the Nakajima et al. reference, which discusses the use of a UV curing adhesive agent that is applied between the coupling lens and the mounting portion of a supporting member. The Applicant submits that the cured adhesive agent is not *a portion of the coupling lens*, but rather is feature separate from the

coupling lens that is placed thereon. However, the adhesive agent clearly does not constitute a portion thereof.

Thus, the Nakajima et al. reference fails to supplement the deficiencies in the teachings of the Naiki reference and the Iwanaga reference noted in the Official Action. Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 5, 10, 29, and 34 and all the claims that depend therefrom.

Claim 15 recites a light source unit that comprises, among other features, a light source holding unit attached to the coupling lens holding unit for holding a first light source of the plurality of light sources corresponding to the first coupling lens, wherein the coupling lens holding unit, a package unit of a semiconductor laser diode, and the light source holding unit are formed of materials which are selected to satisfy the following relationships:  $\alpha_3 < \alpha_1$ ,  $\alpha_3 \leq \alpha_2 \leq \alpha_1$  and  $\alpha_3 \leq \alpha_4 \leq \alpha_1$ , where  $\alpha_1(1/K)$ ,  $\alpha_2(1/K)$ ,  $\alpha_3(1/K)$  and  $\alpha_4(1/K)$  are coefficients of linear thermal expansion of the first coupling lens, the coupling lens holding unit, the package unit and the light source holding unit, respectively. Claim 39 recites similar features using means-plus-function terminology. The Applicant submits that the Naiki reference and the Iwanaga reference fail to disclose or suggest such features, either when taken singularly or in combination.

The Official Action cites holder (8) of the Tanaka et al. reference for the teaching of the light source holding unit, and lens holder (4) for the teaching of the package unit or means of a semiconductor diode recited in Claims 15 and 39. However, the Applicant submits that the Tanaka et al. reference describes feature (1) as the package, rather than lens holder (4).

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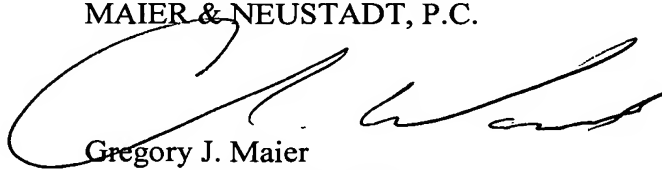
Furthermore, the holder (8) does not support the semiconductor laser (6), but rather stem (7) holds the semiconductor laser (6) and therefore should be cited for the light source holding unit of the present application. The Applicant notes that the Tanaka et al. reference does not disclose a particular material for use as the stem (7). Thus, the Tanaka et al. reference fail to disclose any particular coefficient of linear expansion for the light source holding unit, and therefore the Tanaka et al. reference clearly does not disclose all of the limitations recited in Claims 15 and 39, which require a coefficient that satisfies the defined inequalities.

The Naiki and Iwanaga references fail to supplement the above deficiency in the teaching of the Tanaka et al. reference. Accordingly, the Applicant respectfully requests the withdrawal of the obviousness rejection of Claims 15 and 39.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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